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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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THOMAS, KAYDEN, HORSTEMEYER & RISLEY, LLP
100 GALLERIA PARKWAY, NW
STE 1750
ATLANTA, GA 30339-5948

EXAMINER	
LUGO, DAVID B	
ART UNIT	**PAPER NUMBER**
2637	

DATE MAILED: 11/16/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/766,255	BETTS, WILLIAM L.	
	Examiner	Art Unit	
	David B. Lugo	2637	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 September 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *2,4,5,8,11,14,16,18,29,31 and 34-48* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *2,4,5,8,11,14,16,18,29,31 and 42* is/are allowed.

6)☒ Claim(s) *34-38,40,41 and 43-48* is/are rejected.

7)☒ Claim(s) *39* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 9/6/05 has been entered.

Response to Amendment

2. The affidavit under 37 CFR 1.132 filed 9/6/05 is insufficient to overcome the rejection of claims 34, 36, 37, 38, 40 and 41 based upon Tzannes and Helms et al. applied under 35 U.S.C. 103 as set forth in the last Office action. Affiant has indicated the above cited references, when used in accordance with the G.992.1 specification, allows tones assigned the same bit density to be adjacent in frequency, and that the claimed invention does not allow two tones which are adjacent in frequency to have the same bit density (see pages 5-6 of affidavit). The Examiner is not disputing this statement. However, as evidenced by the BAT in Tzannes, it is possible for tones which are adjacent in frequency to have different bit densities. Although it is recognized that this may be a special case, it is still considered to read on the language recited in the claim, which recites that bits are assigned to at least a portion of the tones "such that tones that are adjacent in frequency are assigned different bit densities." Affiant states in page 3 of the affidavit: "I attach no significance to the fact that adjacent tones in Table 1 have different bit densities, and consider this to be only a coincidence". However, even though it may be a

coincidence that the BAT of Table 1 has adjacent tones with different bit densities, it is still considered to meet the limitations recited in the claim.

Response to Arguments

3. Applicant's arguments filed 9/6/05 have been fully considered but they are not persuasive. Applicant refers to the affidavit filed under 37 CFR 1.132 in order to overcome the rejections stated in the previous Office action. Since the affidavit is considered insufficient to overcome the rejections, the rejections are maintained, and restated below.

Claim Objections

4. Claims 37-39, 46 and 47 are objected to because of the following informalities:

a. Claim 37, line 8, "freqeuency" should be --frequency--.

b. Claim 47, line 2, "encodoing" should be --encoding--.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

6. Claims 43-48 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claims 43 and 46-48 recite that a convolutional encoder encodes the bits to produce a series of symbols encoded on the tones, such that "tones that are adjacent in frequency appear on

non-consecutive symbols". This limitation is not described in the specification as originally filed, and are thus considered new matter. It is respectfully requested that the portions of the specification providing support for this limitation be pointed out to the Examiner.

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claims 43-48 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

9. Claims 43-48 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 43 and 46-48 recite that a convolutional encoder encodes the bits to produce a series of symbols encoded on the tones, such that "tones that are adjacent in frequency appear on non-consecutive symbols". While it is understood that bits can be assigned to tones, it is unclear how a tone appears on a symbol, as claimed. It is respectfully requested that this limitation be clarified.

Claim Rejections - 35 USC § 103

10. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

11. Claims 34, 36-38, 40 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tzannes U.S. Patent 6,498,808 in view of Helms et al. U.S. Patent 6,144,695 (submitted by applicant).

Regarding claim 34, Tzannes discloses a transmitter in Figure 3 including a bit allocation table (BAT), shown in Table 1 (col. 2, lines 16-38), illustrating that each of a series of tones is associated with a bit density, and the number of bits assigned to each tone is different from the number of bits assigned to the tones adjacent in frequency, thereby resulting in different bit densities, wherein the BAT also contains the gain for each subchannel (col. 20, lines 1-10).

Tzannes does not expressly disclose a tone ordering element configured to assign bits to at least a portion of the tones in an interleaved manner.

Helms et al. disclose a tone ordering element 330 in the dual latency DMT system of Fig. 3A, considered to be configured to assign bits to at least a portion of the tones in an interleaved manner.

It would have been obvious to one of ordinary skill in the art to use a tone ordering element as disclosed by Helms et al. in the dual latency system of Tzannes, in order to comply with the ANSI standard (Helms et al., col. 2, lines 40-42) as Helms et al. further state that tone ordering circuitry is necessary for generating and ordering the discrete multi tones of a DMT modem (col. 3, lines 1-3).

Regarding claim 36, Tzannes discloses that the receiver sends a BAT to the transmitter (Fig. 4 – block 440), which may be adapted during system operation (block 420, col. 12, lines 43-44, col. 13, lines 29-44).

Regarding claim 37, Tzannes discloses a transmitter in Figure 3 including a bit allocation table (BAT), as shown in Table 1 (col. 2, lines 16-38), illustrating that each of a series of tones is associated with a number of bits, wherein the BAT also contains the gain for each subchannel (col. 20, lines 1-10).

Tzannes does not expressly disclose a tone ordering element comprising logic for assigning each of the bits to one of the tones according to the bit and gain information, and logic for interleaving a portion of the bits assigned to adjacent tones.

Helms et al. disclose a tone ordering element 330 and an interleaver 325 in the dual latency DMT system of Fig. 3A, considered to assign bits to tones and interleave at least a portion of the assigned bits.

It would have been obvious to one of ordinary skill in the art to use a tone ordering element as disclosed by Helms et al. in the dual latency system of Tzannes, in order to comply with the ANSI standard (Helms et al., col. 2, lines 40-42) as Helms et al. further state that tone ordering circuitry is necessary for generating and ordering the discrete multi tones of the DMT modem (col. 3, lines 1-3).

Regarding claim 38, the bits assigned to each tone are determined according to the noise on the subchannels (col. 1, lines 61-65).

Regarding claim 40, Tzannes discloses a transmitter in Figure 3 including a bit allocation table (BAT), shown in Table 1 (col. 2, lines 16-38), illustrating that each of a series of tones is associated with a bit density, and the number of bits assigned to each tone is different from the number of bits assigned to the tones adjacent in frequency, thereby resulting in different bit densities, wherein the BAT also contains the gain for each subchannel (col. 20, lines 1-10). The bits are framed to be part of a data frame in framer 130. Tzannes further discloses that the BAT is received at the transmitter (Fig. 4 – block 440, col. 13, lines 29-44).

Tzannes does not expressly disclose assigning bits to at least a portion of the tones in an interleaved manner.

Helms et al. disclose a tone ordering element 330 in the dual latency DMT system of Fig. 3A, considered to be configured to assign bits to at least a portion of the tones in an interleaved manner.

It would have been obvious to one of ordinary skill in the art to use a tone ordering element as disclosed by Helms et al. in the dual latency system of Tzannes, in order to comply with the ANSI standard (Helms et al., col. 2, lines 40-42) as Helms et al. further state that tone ordering circuitry is necessary for generating and ordering the discrete multi tones of the DMT modem (col. 3, lines 1-3).

Regarding claim 41, Tzannes discloses a transmitter in Figure 3 including a bit allocation table (BAT), as shown in Table 1 (col. 2, lines 16-38), illustrating that each of a series of tones is associated with a bit density, wherein the BAT also contains the gain for each subchannel (col. 20, lines 1-10) and the bit and gain information is assigned to the tones. Tzannes further discloses that the BAT may be sent to the transmitter from a receiver (Fig. 4 – blocks 440, 450, col. 13, lines 29-44), and further disclose that the method may be embodied in a computer program contained in a computer readable medium (e.g. claim 49).

Tzannes does not expressly disclose assigning each of the bits to one of the tones according to the bit and gain information and interleaving a portion of the bits assigned to adjacent tones.

Helms et al. disclose a tone ordering element 330 and an interleaver 325 in the dual latency DMT system of Fig. 3A, and is considered to assign bits to tones, and interleave at least a portion of the assigned bits.

It would have been obvious to one of ordinary skill in the art to use a tone ordering element as disclosed by Helms et al. in the dual latency system of Tzannes, in order to comply with the ANSI standard (Helms et al., col. 2, lines 40-42) as Helms et al. further state that tone ordering circuitry is necessary for generating and ordering the discrete multi tones of the DMT modem (col. 3, lines 1-3).

12. Claim 35 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tzannes in view of Helms et al. as applied to claim 34 above, and further in view of Levin U.S. Patent 5,822,374 (previously cited).

Regarding claim 35, Tzannes and Helms et al. disclose a DMT communication system as described above, but do not expressly disclose raising the power on a first group of tones and lowering the power on a second group of tones in the bit assignment.

Levin discloses a method for fine gains adjustment in an ADSL system in Fig. 7 where a gain of a bin is adjusted up while a gain of another bit is adjusted down by a corresponding amount.

It would have been obvious to one of ordinary skill in the art to use the fine gain adjustment of Levin in the DMT system of Tzannes and Helms et al. in order to provide the best BER without changing the transmit power (Levin, col. 2, lines 42-53).

Allowable Subject Matter

13. Claims 2, 4, 5, 8, 11, 14, 16, 18, 29, 31 and 42 are allowed.

14. Claim 39 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David B. Lugo whose telephone number is 571-272-3043. The examiner can normally be reached on M-F; 9:30-6.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jay Patel can be reached on 571-272-2988. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

David Lugo
11/11/05

JAY K. PATEL
SUPERVISORY PATENT EXAMINER